OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **MAXWELL POND** the program coordinators recommend the following actions.

We are pleased to welcome the Manchester Urban Ponds Restoration Project to the New Hampshire Volunteer Lake Assessment Program. Manchester's volunteers collected a lot of samples this summer and we applaud them for their efforts. Although it takes a few years to establish lake quality trends, we hope that this project will encourage the citizens of the city to continue their active participation in sampling and help to reverse the degraded conditions of the ponds. We encourage the Project Coordinator to establish a wet weather sampling program in the future. Samples collected during rain events allow us to determine non-point sources of pollution to the pond. Since the project's goals include restoring the quality of the urban ponds and reducing pollutant loads data collected from wet weather sampling allows biologists to better evaluate phosphorus loading to the lake.

FIGURE INTERPRETATION

- Figure 1: These graphs illustrate concentrations of chlorophyll-a, also a measure of algal abundance, in the water column. Algae are microscopic plants that are a natural part of lake ecosystems. Algae contain chlorophyll-a, a pigment necessary for photosynthesis. A measure of chlorophyll-a can indicate the abundance of algae in a lake. The historical data (the bottom graph) show *low* in-lake chlorophyll-a values. The most common algae documented were diatoms. While algae are present in all lakes, an excess amount of any type is not welcomed. Concentrations can increase when there are external sources of phosphorus, which is the nutrient algae depend upon for growth. It's important to continue the education process and keep residents aware of the sources of phosphorus and how it influences lake quality.

- Figure 2: Water clarity is measured by using a Secchi disk. Clarity, or transparency, can be influenced by such things as algae, sediments from erosion, and natural colors of the water. The graphs on this page show historical and current year data. On both dates this summer the Secchi disk was visible at the bottom of the pond. The 2000 sampling season was considered to be wet and could affect the average clarity readings. Higher amounts of rainfall usually cause more eroding of sediments into the lake and streams, thus decreasing clarity.

- Figure 3: These figures show the amounts of phosphorus in the epilimnion (the upper layer in the lake); the top graph shows current year data. Phosphorus is the limiting nutrient for plants and algae in New Hampshire waters. Too much phosphorus in a lake can lead to increases in plant growth over time. These graphs show in-lake phosphorus levels are *higher* than the New Hampshire median. The high phosphorus and turbidity may be a result of sampling too close to the bottom sediments or due to disturbances created by the wind mixing the lake. We suggest that next year the samples be taken at the surface. One of the most important approaches to reducing phosphorus levels is educating the public. Humans introduce phosphorus to lakes by several means: fertilizing lawns, septic system failures, and detergents containing phosphates are just a few. Keeping the public aware of ways to reduce the input of phosphorus to lakes means less productivity in the lake. Contact the VLAP coordinator for tips on educating your lake residents or for ideas on testing your watershed for phosphorus inputs.

OTHER COMMENTS

- Please make note of the comment in the Notes section below regarding the conductivity value of the Storm drain Inlet on September 15th. It is not a certainty that this reading was incorrect, however, on only a few occasions this summer did our conductivity meter give a value less than fifteen. It is possible that the person performing the analysis did not notice the conductivity unit change from µS/cm to mS/cm. We recommend that the storm drain be tested again next summer to verify the results.

- Conductivity levels in Maxwell Pond are lowest of all the Manchester Urban Ponds! Additional samples in the future will help to establish conductivity trends for the watershed.

NOTES

- Monitor's Note (5/18/00): Rain event occurring when sampled inlet and outlet. Water temp was 15.3°; 83% O_2.

- Monitor's Note (7/5/00): *Elodea*, bladderwort abundant on bottom. Pickerelweed on periphery, yellow pond lilies on surface. Six mallards, two shopping carts. Tiny fish in schools.

- Monitor's Note (9/15/00): Wet weather inlet and storm drain samples only.

- Biologist's Note (9/15/00): Conductivity result questionable for storm drain inlet; maybe 10490 µS/cm.

- Monitor's Note (10/12/00): Surface-12.9°C, 8.0 mg/L O_2, 76% saturation.

USEFUL RESOURCES

Road Salt and Water Quality, WD-WSQB-7, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

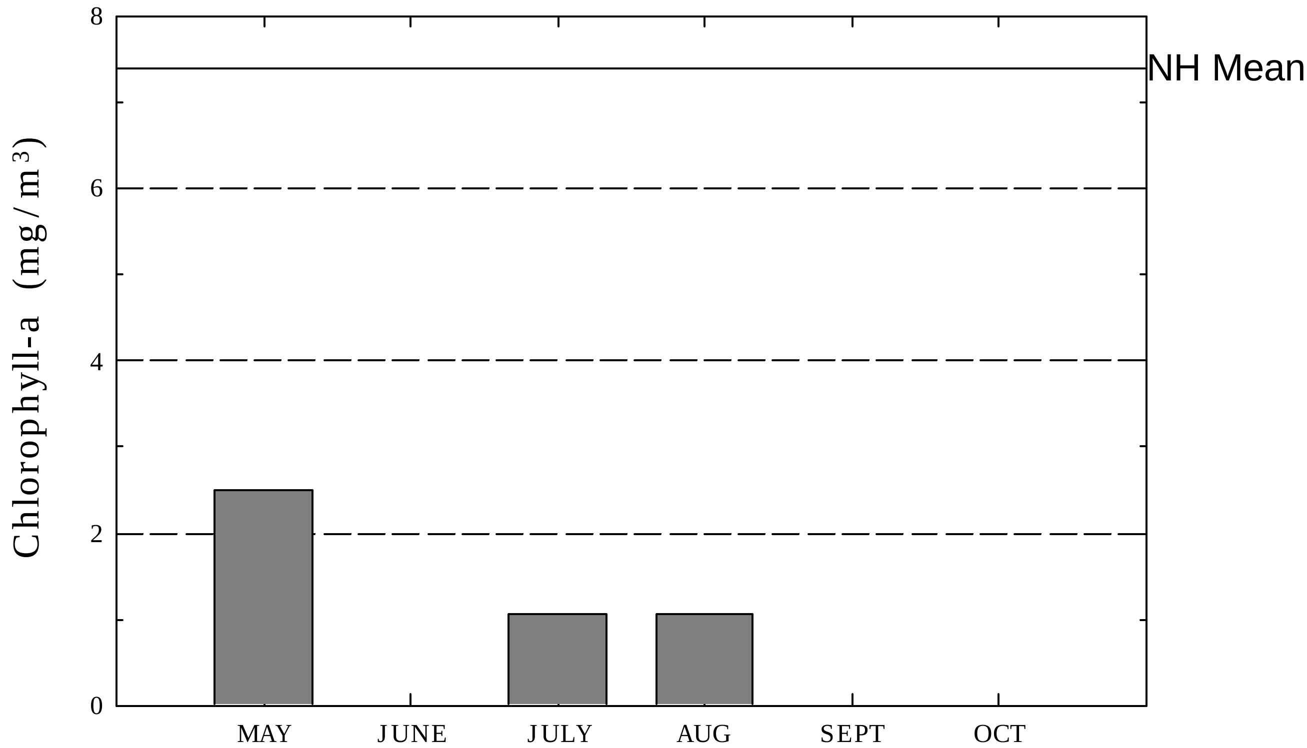
Aquatic Plants and Their Role in Lake Ecology, WD-BB-44, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Handle With Care: Your Guide to Preventing Water Pollution. Terrene Institute, 1991. (703) 661-1582.

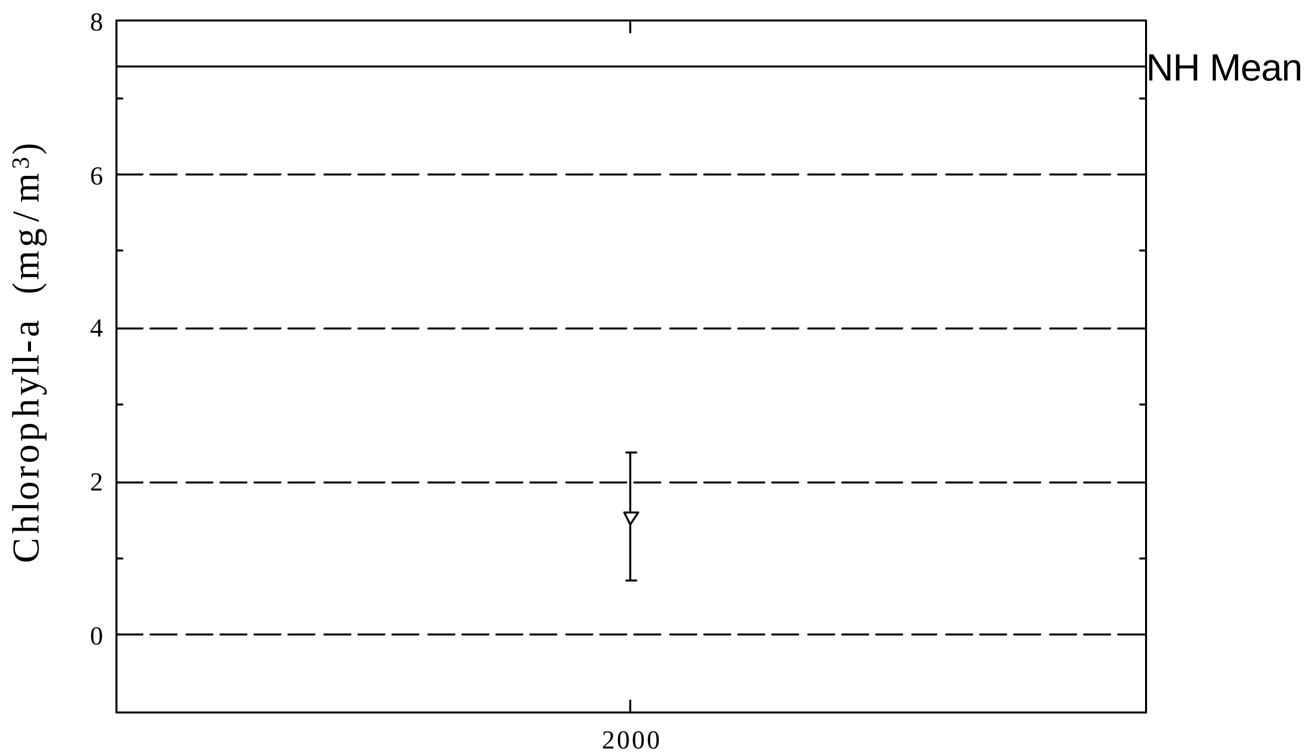
Anthropogenic Phosphorus and New Hampshire Waterbodies, NHDES-WSPCD-95-6, NHDES Booklet, (603) 271-3503

Maxwell Pond

Figure 1. Monthly and Historical Chlorophyll-a Results



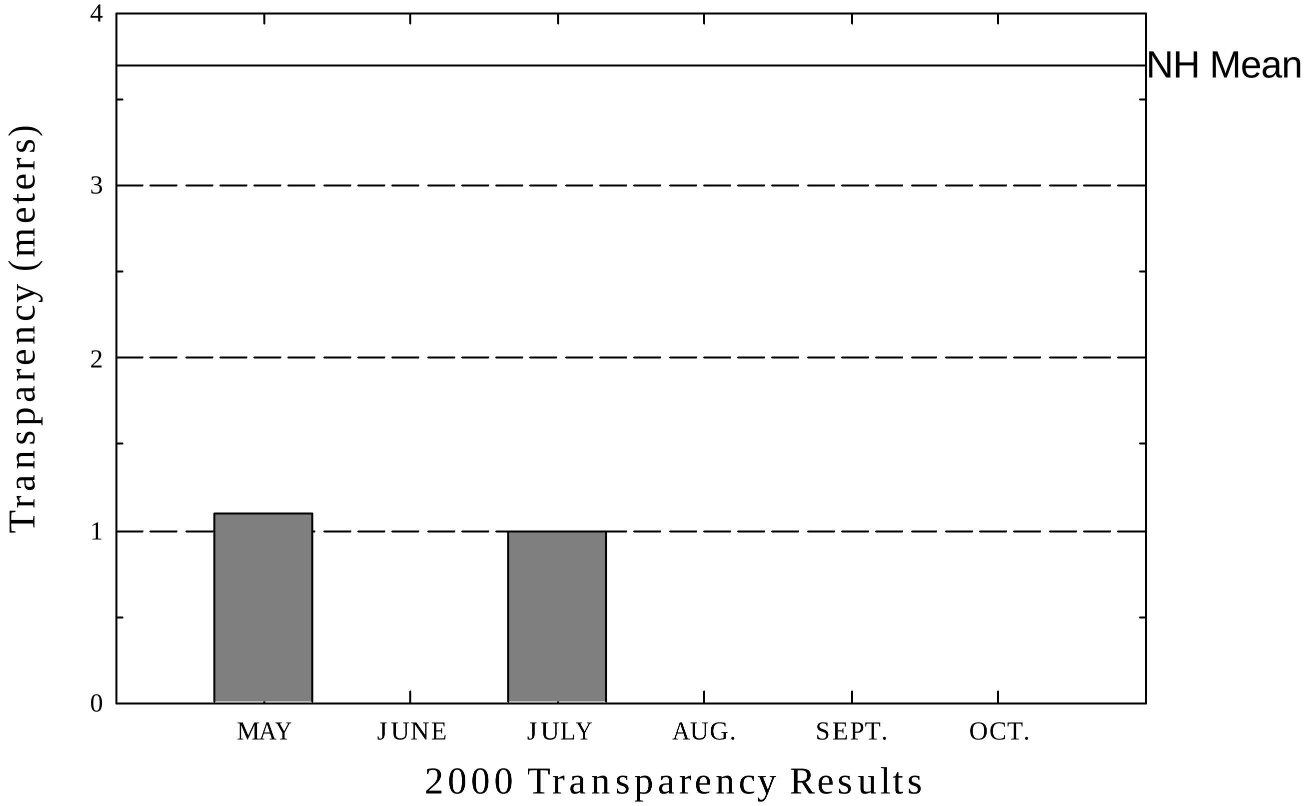
2000 Chlorophyll-a Results



Historical Chlorophyll-a Results

Maxwell Pond

Figure 2. Monthly and Historical Transparency Results



Maxwell Pond

Figure 3. Monthly and Historical Total Phosphorus Data.

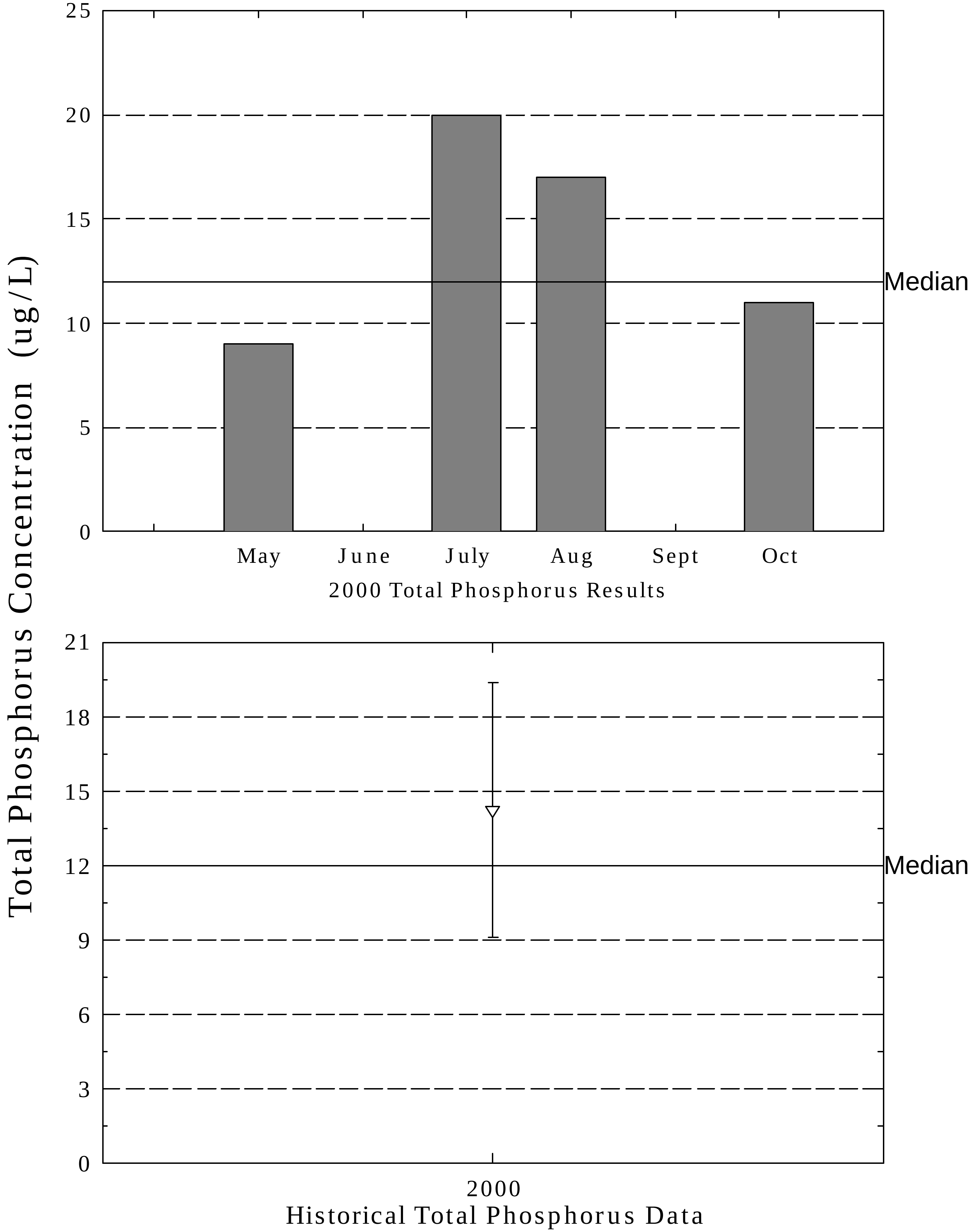


Table 1.

MAXWELL POND

MANCHESTER

Chlorophyll-a results (mg/m^3) for current year and historical sampling periods.

Year	**Minimum**	**Maximum**	**Mean**
2000	1.07	2.51	1.79

Table 2.

MAXWELL POND

MANCHESTER

Phytoplankton species and relative percent abundance.

Summary for current and historical sampling seasons.

Date of Sample	Species Observed	Relative % Abundance
05 / 18 / 2000	ASTERIONELLA	29
	SYNEDRA	29
	TABELLARIA	14
07 / 05 / 2000	CYCLOTELLA	97
	DINOBRYON	3

Table 3.

MAXWELL POND

MANCHESTER

Summary of current and historical Secchi Disk transparency results (in meters).

Year	Minimum	Maximum	Mean
2000	1.0	1.1	1.0

Table 4.

MAXWELL POND
MANCHESTER

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	2000	6.40	6.69	6.46
INLET				
	2000	6.32	6.72	6.55
N STORMDRAIN INLET				
	2000	5.66	5.66	5.66
OUTLET				
	2000	0.00	6.82	6.73

Table 5.

MAXWELL POND

MANCHESTER

Summary of current and historical Acid Neutralizing Capacity.
Values expressed in mg/L as CaCO .

Epilimnetic Values

Year	Minimum	Maximum	Mean
2000	4.50	8.70	6.78

Table 6.

MAXWELL POND
MANCHESTER

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	2000	98.7	133.9	121.7
INLET				
	2000	97.6	131.5	120.6
N STORMDRAIN INLET				
	2000	10.4	10.4	10.4
OUTLET				
	2000	98.7	134.7	121.8

Table 8.

MAXWELL POND
MANCHESTER

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	2000	9	20	14
INLET				
	2000	14	32	18
N STORMDRAIN INLET				
	2000	211	211	211
OUTLET				
	2000	11	21	16

Table 9.

MAXWELL POND
MANCHESTER

Current year dissolved oxygen and temperature data.

Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
July 5, 2000			
0.1	27.4	6.8	85.0

Table 10.

MAXWELL POND

MANCHESTER

Historic Hypolimnetic dissolved oxygen and temperature data.

Date	**Depth** (meters)	**Temperature** (celsius)	**Dissolved Oxygen** (mg/L)	**Saturation** (%)
July 5, 2000	0.1	27.4	6.8	85.0

Table 11.

MAXWELL POND

MANCHESTER

Summary of current year and historic turbidity sampling.
Results in NTU's.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	2000	1.1	2.9	2.0
INLET				
	2000	0.8	1.6	1.2
N STORMDRAIN INLET				
	2000	6.0	6.0	6.0
OUTLET				
	2000	1.2	2.9	2.0